

# Hepatitis C Virus NS3-NS4A Protease Inhibitors from the Endophytic *Penicillium chrysogenum* Isolated from the Red Alga *Liagora viscida*

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Hepatitis C virus (HCV) NS3-NS4A protease is an attractive target for anti-HCV agents because of its important role in replication. In this work, we demonstrated that the ethyl acetate extract of the endophytic fungus *Penicillium chrysogenum* exhibited a potent activity against HCV NS3-NS4A protease with an IC<sub>50</sub> value of 20 µg/ml. The fungus was isolated from the red alga *Liagora viscida* and identified by its morphology and 18S rDNA. Large-scale fermentation of the fungus in Czapek's peptone liquid medium followed by chromatographic purification of the active extract from the liquid medium allowed the isolation of twelve known metabolites. The biological properties of the isolated compounds were explored for anti-HCV protease as well as antimicrobial and anticancer activities. A computational docking study of the active isolated compounds against HCV protease was used to formulate a hypothetical mechanism for the inhibitory activity of the active compounds on the tested enzymes.

**Key words:** Red algae, *Liagora viscida*, *Penicillium chrysogenum*, HCV NS3-NS4A Protease